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Spill over effects of executive incentives on corporate cash holdings: Evidence from Australia

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Abstract

We examine the effects of chief executive officer (CEO) compensation incentives on cash holdings in Australia, augmented with *Remuneration Act 2011*, to better understand how the regulatory changes affect the incentives to align the interest of shareholders and managers. We use sample of top 300 ASX listed firms over the period from 2004–2015 (3600 observations). We find a negative relationship of equity incentives with cash holding after the promulgation of new regulatory change on compensation. We also find that the negative effect of regulatory changes is robust after controlling for corporate governance mechanism. In a finer analysis, we document that the negative relationship makes the managers incapable to extract rent in the presence of governance mechanism and independent remuneration committee. Furthermore, our evidence supports the precautionary motive of cash holding.

Key words: Cash holding, Australia, compensation, corporate governance.

JEL Codes: G30, G32, G34, G38

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1 Introduction

Why do firms hold cash? Tremendous cash holdings by corporations worldwide has led to serious deliberations from practitioners and academics to find the answer to the question. Possible explanations offer diverse motives of holding large amount of cash. Paradoxically, among popular views of cash holding are transaction cost, precautionary, and agency motive. The first motive is to save transaction cost by holding cash for making payments without liquidating assets. The second motive, which is allegedly the more important one, contends that firm can hedge the risk of future cash shortfalls when external funds would be costly[2]. The third motive argues that the decision how to deploy the cash reserves is central to the conflict between stockholders and managers. Thus, the propensity for cash reserves lower the firm risk and also an excellent instrument for managers to pursue personal advantageous corporate policies and self-perquisites[3]. The classical wisdom for firms is to offer equity incentives to managers to shape the managerial behaviour to align the interest of owners and risk–eschew agents (Jensen & Meckling, 1976; Tosi & Gomez, 1989)[4].

CEO's equity based incentives have long been discussed as motivation to managers for risk-taking but the important link of liquidity policy with executives' compensation is mainly disregarded in literature (e.g., Myers, 1977; Jensen, 1986). Firm's liquidity policy would seem to be an ideal to explore the link between different compensation incentives and is especially true given the large cash holdings worldwide. Prior studies typically

[2] For instance (see, Keynes, 1936; Myers & Majluf, 1984) explains the behavior as transaction cost motive because presence of asymmetry information between firm and external investors gives rise to cost of raising external fund.

[3] In consistent with the rent extraction theory, managers hold cash to pursue the self-serving benefits. Cash reserves are accessible with little outside scrutiny providing the opportunity to squander funds by investing in value destroying ventures and acquisitions (Shleifer & Vishny, 1989; Malmendier & Tate, 2008).

[4] Agency problem is a source of costly financing and financial restrictions (Jensen & Meckling, 1976; Myers, 1977). Therefore, sometimes managers maintain large cash balances to minimize the external financing cost in imperfect markets in view of precautionary motive of cash holding.

carry the broader framework of "neoclassical" rationality exercised by executives in response to executive incentives. However, *Remuneration Act 2011* embraces the model of regulatory environment suggesting unconventional drivers that potentially propose brand new perspectives of cash reserves. The new regulation prohibits the executives from hedging of unvested equity and provides the binding-vote power to shareholders. Accordingly, the objectives of our study are to investigate: 1. whether equity based executive compensation affects the cash holding in Australia; 2. to what degree *Remuneration Act 2011* affects the liquidity policy and executive compensation decisions in the presence of governance mechanism.

Regulatory changes are common and significant practices to control business features and policies around the world, although whether these changes create value for firms is still a controversial issue. Murphy (2013) suggests that any compensation policy which ignores the government regulatory and tax statutes is more likely to ignore important aspect of executive pay. *Remuneration Act 2011* was promulgated to rationalize the executive incentives and firm's liquidity policies following the global financial crisis (GFC). The regulation is aimed to control the influence of large shareholders on remuneration policy by providing binding–vote power to minority group. The regulation prohibits the key managerial personnel (KMP) to hedge their unvested equity incentives by making sure the equal distribution of the cost of KMP actions among shareholders and agents. Prior studies look into the effects of *Remuneration Act 2011* with an aim to investigate pay–performance link and future pay trends (e.g., Monem & Ng, 2013; Grosse, Kean, & Scott, 2015). The important links of compensation incentives with cash holding and, stockholders/managers conflict are largely overlooked.

The role of executive equity incentives in holdings cash level is inconclusive, given that the competing data view and mixed results in the US setting. Prior studies report

contradictory findings using data in the same market (e.g., Tong, 2010; Liu & Mauer, 2011). For instance, Tong (2010) uses the data from 1993–2000 and reports the significant negative association of CEO vega, delta[5], and cash holding. Liu and Mauer (2011) report positive relationship of CEO vega and cash holding using sample period from 1992–2006. The study supports the precautionary cash holding to avoid costly external finance and to satisfy the debtholders. The study implies the positive findings based on highly levered firms by overlooking the low debt and zero debt firms. One of the risk incentive measures, i.e. vega and delta is risk inducing while other is risk reducing. Chava and Purnanandam (2010) argue that vega induces risk by lowering the cash reserves whereas, delta induces risk aversion. Liu and Mauer (2011) report vega as risk reducing and delta as risk inducing incentive whereas, (Tong, 2010) deals vega and delta as risk increasing incentives. The conflicting arguments warrant further examination of managerial compensation and shareholders/managers conflict. The scope of studies do not cover the global financial turmoil originated in the US and *Dodd-Frank act 2010* potentially to be the part of the earlier studies to comprehend the findings rigorously, as the act empowers the stockholders to give binding vote once in every three years (Thomas, Palmiter, & Cotter, 2012).

We investigate the impact of *Remuneration Act 2011* on cash holding and CEO compensation using sample period of 2004 to 2015. The relationship is characterized by unique governance practices and use of 'at risk' pay incentives. We argue that regulatory changes affect the liquidity policy as a result of change in compensation[6] because new

5 Vega is the change in managerial wealth for any change in stock return while delta is change in manager's wealth for any change in stock price of firm.

6 Murphy (2013) suggests that any CEO compensation policy which ignores the government regulatory and tax statutes is more likely to ignore important aspect of executive pay. Australian stock exchange (ASX) corporate governance principles and recommendation

regulations prohibit the managers to hedge their equity. Our study differs from others in the following aspects. First, our study uses the period covering non-binding vote effects (*CLERP9*) 2004 to onward the global liquidity crunch and *Remuneration Act 2011* on Australian listed firms. Second, our study includes the managerial power variables addressing omitted variables concerns in the previous studies (Tong, 2010; Liu & Mauer, 2011). This study more specifically provides empirical evidence by answering the major question: Do the equity based compensation have an association with cash holding in Australia after spill over effect of *Remuneration Act 2011*?

This study takes the first doer advantage of the unique environment of Australian listed firms where (1) shareholders have more power to take enforcement action against managerial self–interest, (2) compensation structure is unlike the UK and US where managers are offered less cash bonuses and cash compensation than equity based incentives, (3) the governance structure is dissimilar to UK and US where low proportion of independent directors and CEO duality is very common. The unique facets make it interesting to investigate the impact of executive compensation on cash holding.

By using the sample of top 300 capitalized listed firms on ASX from 2004–2015, we investigate the impact of remuneration act on compensation incentives and firm's liquidity policies. We find a positive association between equity compensation and cash holding. Further, we also examine the impact of regulatory changes on compensation incentives. We find that new Australian regulation on compensation of managers does not let managers to extract rent in the presence of governance mechanism and independent remuneration committee. In a finer analysis, we find that *Remuneration Act 2011* controls

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3rd edition (effective July, 2014) also recommends equity based compensation to company executives to align the interest of shareholders but with a watch to take undue risk and falling in "short-termism".

the agency issue by providing two way power to shareholders and decreases the likelihood of expropriation by managers. Regulation aligns the interests of managers and stockholders. Overall our findings support the regulation in order to tackle the agency problem in firms.

Accordingly, our paper contributes to current debate in the literature by following ways: First, our paper is the first to investigate the relation of equity compensation and firm cash holding augmented with binding–vote rule in Australia, as we are unknown to any other study which considers the effects of *Remuneration Act 2011* on cash holding. Furthermore, our study holds distinction from others by using broad sample unlike earlier studies which use small sample of historical and small data[7].

Second, we extend the literature by examining the effects of equity based compensation on corporate liquidity policy in a unique setting where market regulatory features are different from those in the US. Regulatory changes in Australian setting enable us to perform more powerful tests of the precautionary and alignment hypothesis. Our empirical evidence offers a new dimension of research helping finance scholars to understand agency problems associated with equity based compensation and cash holding relationship through the lenses of *Remuneration Act 2011*. Moreover, our findings are helpful for remuneration committee to devise different compensation structures for different firms. Our findings allow the wider investors and stakeholder's community to make prudent decisions based on the impact of EBC compensation on manager's risk

[7] For example, Chalmers et al., (2006) use four years from 1999-2002, Budgeja et al., (2012) use eight years from 2000-2008, others Coulton and Taylor (2002); Fleming and Stellios (2002) adopt only single year to infer results. These studies employ panel fixed effect in short time span (Coulton & Taylor, 2002; Chalmers, Koh, & Stapledon, 2006) n=4, 1 respectively. This model may not be suitable for short time series (Baltagi, Bratberg, & Holmås, 2005,p.13). However, our estimates are based on long time series (n=12).

taking. The study is also useful for investor to evaluate liquidity pattern of Australian firms before they make investment decisions.

The remainder of paper is organised as follows. Section 2 elaborates the literature and section 3 contains hypothesis development. Section 4 explains research design while section 5 discusses the results and 6 concludes the study.

2 Literature Review

2.1 International studies

Cash holding is one of the paramount policy central to firms. This is especially becomes true when previous studies elaborates the large cash holding by firms as compared to total assets proportion (Bates, Kahle, & Stulz, 2009; Liu, Luo, & Tian, 2015). Cash holding has different motives i.e. transaction motive, precautionary motive (Opler, Pinkowitz, Stulz, & Williamson, 1999), tax motive and agency problem (Dittmar & Mahrt-Smith, 2007; Harford, Mansi, & Maxwell, 2012).

Agency theory posits explanations of cash holding such as transaction cost and risk aversion hypothesis. According to transaction cost, cash holding is viewed as source of funding available to seize the investment opportunities and to avoid under–investment at any time due to potential cost of market frictions in raising costly external capital (Opler et al., 1999). Growth firm with frequent investment opportunities also tend to hold large cash reserves to seize the investment opportunities as they become available (Kim, Mauer, & Sherman, 1998). Risk aversion hypothesis is agency problem occurs when managers preferences towards risk different than shareholders. So, risk-eschew managers allocate cash holding to reduce the risk of firm while selecting lower NPV projects (Cassell, Huang, Sanchez, & Stuart, 2012).

Equity based incentives offered to risk–eschew managers as part of compensation may enhance the risk taking as argued by Jensen and Meckling (1976) whereas, Core and Guay (1999) develops the framework of managerial incentives on the basis of equity compensation. The studies in literature attempt to relate the question of whether equity based compensation have economical and evident connection with liquid assets and cash holding of firm (see e.g., Jensen & Meckling, 1976; Myers, 1977; Gaver & Gaver, 1993; Core & Guay, 1999). This spate of literature share the common argument that equity based compensation pay-off is an appealing tool for risk averse managers to offer incentives for risk exposure and undertaking risk investments

Although the argument of risk-taking as a result of equity incentives from literature, requires intuitiveness on part of manager while taking risk. Parrino, Poteshman, and Weisbach (2005) describe that prudent risk taking can be encouraged among managers through options instead of monetary offers. Rajgopal and Shevlin (2002) show a positive association between equity based compensation and oil exploration risk. In the light of trade–off theory, managers who maximize the wealth of shareholders and enhance the value of firm by holding optimal level of cash (Opler, Pinkowitz, Stulz, & Williamson, 1999) that equates the benefit and cost of cash holding. In the light of above mentioned literature, equity compensation is one of the powerful tool to control the agency problem among managers and stockholders.

The recent body of cash holding and risk incentives literature includes studies (e.g., Tong, 2010; Liu & Mauer, 2011) which consider the risk related agency cost of cash holding by using US firms and provide evidence in consistent with agency theory with competing views. Liu and Mauer (2011) share the view of positive association of risk incentives (vega) with cash holding using the US market sample from 1992–2006. The

analysis is consistent with costly transaction cost hypothesis. Conversely, (Tong, 2010) observes the risk-aversion hypothesis using a sample 1768 firms from 1993–2000 and finds higher CEO incentives leads less cash reserves in consistent with alignment hypothesis. These studies potentially require to include *Dodd Frank act 2010* to understand the background drivers of cash holding (where firms were in practice to hold more cash as precautionary measure than they use to before crises[8]).

Cash holding and firm investment level is explored by (Xu, 2013) while considering the entrenchment effect of managerial ownership whereas, (Elyasiani & Zhang, 2015) report the high agency cost by entrenched managers as they prefer to hold cash instead of using line of credit. These studies suggest the hypothetical cash levels for small and large firms but the suggested level of cash do not based on fact and figure but a hypothetical one. Figure 1 provides the imaginary optimal level of cash holding which fluctuates between upper and lower limit.

[Insert Figure 1 about here]

However, on the other hand literature suggests positive effect of holding large cash reserves. For instance, Mikkelson and Partch (2003) investigate the cash holding and firm performance and they suggest that large cash holding do not lead to poor corporate performance. Similarly, (Opler et al., 1999) find higher cash holding as a result of precautionary motive to avoid losing out on positive investments as a consequence of cash deficiencies. The upshot is, cash holding increases the firm value by reducing the cost of external costly finance and undertaking the value inducing investments. This

[8] Bates et al. (2009) reports average cash ratio more than double from 10.5% to 23.2% in US.

argument is consistent with (Boyle & Guthrie, 2003) who suggest that large cash holding is necessary for firm to seize future investments.

2.2 Confronting to EBC

Equity based compensation do not always considered worthwhile to surge risk–taking behaviour on the part of managers. Equity compensation has underlying tumult that may impose greater costs on the firm than providing cash compensation. Risk–averse managers has their wealth linked with firm's stock prices, then their perceived worth of equity based component can be substantially lower than its cost to shareholders (Lambert, Larcker, & Verrecchia, 1991; Beauty and Zajac, 1994). Meulbroek (2001) argues that undiversified managers value options and stocks less than their rational market value. For example, an undiversified manager in internet based firm values option based compensation at an average of 53% of the cost to firm. Managers can also believe that firm's stock is undervalued, but still have incentives to sale it whenever there is no bar in doing so. This pattern of stocks and options sold by managers explain the irrational sale behaviour of managers reported by (Core & Guay, 2001).

Theory has focused on potential benefits offered by equity–based compensation but has ignored the resultant cost. Meulbroek (2001) concludes that her results show that the cost of equity–based compensation can be significantly huge. Firms would evaluate the cost and benefits rather than assuming equity-based compensation as an efficient strategy for managers to invest in firm. It might not be efficient for all the firms to offer equity–based compensation but it depends on the characteristics of firm (Bushman & Smith, 2001; Ittner, Lambert, & Larcker, 2003). Equity-based compensation is solution used by large firms to align the interest of managers and shareholders where, direct monitoring of employees is costly and difficult. Firms are large in size and more

decentralised, where more noise in operating environment with more growth opportunities (Gaver & Gaver, 1993; Ryan & Wiggins, 2001). Cash constraint is also expected determinant of equity compensation.

2.3 Studies in Australian Context

Studies in Australia on cash holding are limited to value of cash and product market competition only. Lee and Powell (2011) reports that higher cash balances decreases the marginal value of cash in Australian market. Transitory excess cash earns higher risk–adjusted return than persistent excess cash, given the lower value of cash hoarding. Chan, Lu, and Zhang (2013) report that large cash balances with higher leverage decreases the marginal value of cash for shareholders and also find that excess cash is not always detrimental because of transaction cost for external financing and future needs. A recent study (Li, Henry, & Chou, 2011) on executive compensation and stock mispricing in Australia setting reports positive relationship between equity based compensation and investment of firms where managers take investment decisions concerning their own equity.

A few studies investigate the *Remuneration Act 2011* in context of pay-performance link and disclosure of compensation structure. Monem and Ng (2013) report the consequences on pay-performance link of "two strike" rule in Australia and report contemporaneous dissent vote is positively related to pay-performance link. Firms who receive strike decrease the bonuses of executives by 5.7% than non-strike firms and increase remuneration disclosure by 11%. Grosse et al. (2015) report that higher leveraged firms are more likely to receive dissent vote from shareholders. Overall, *Remuneration Act 2011* effect on cash holding and equity compensation is still unexplored.

3 Hypothesis development

3.1 Corporate cash holding and equity incentives

As cash is liquid asset of the firm, managers can exploit to purse private benefits at lower or minimal cost (Pinkowitz, Stulz, & Williamson, 2006). Since, mangers are responsible for financial decision making and allocation of resources without much outside influence. Agency theory argues that managers can misuse the cash easily to shield themselves from capital market discipline and pursue risk-averse choices while reducing the stockholders value. To achieve better alignment of stakes, a firm can remunerate the under–diversified managers with equity compensation such as stock options (Jensen & Meckling, 1976). Likewise, studies in literature support the equity compensation to increase risk–taking by managers for shareholders value maximization while bearing the cost of their actions (e.g., Coles, Hertzel, & Kalpathy, 2006; Devers, Cannella, Reilly, & Yoder, 2007; Chava & Purnanandam, 2010). Similarly, Williams and Rao (2006) argue that stock options are best suitable means of encouraging the managers to modify their risk incentive behaviour. In addition to that, firms could substitute equity compensation for cash where they face cash shortage (Core & Guay, 2001; Ittner et al., 2003). Hence, increase in equity incentives would decrease the cash holdings. Thus, we hypothesize that:

H1a: Cash holding is negatively associated with CEO equity based compensation.

The firms with higher equity based compensation may face difficulty in raising external funds due to higher risk-return volatility as compared to other firms offering non–equity compensation. Shareholders expect from managers to act in the best interest of the firm. They allow the managers to hoard cash as part of precautionary motive (Opler

et al., 1999) in order to avoid underinvestment at any time due to potential cost of market frictions such as time involved in raising external funds. Large firms with promising growth opportunities also tend to hold large cash reserves to seize the investment opportunities as they become available (Kim et al., 1998). In addition to that, large cash reserves do not necessarily represent conflict between shareholders and managers neither the sign of poor performance but consistent with evidence of firm value maximization (Mikkelson & Partch, 2003). Therefore, higher equity compensation to managers would lead to large cash holdings by reducing the funding risk. Thus, we hypothesize that:

H1b: Cash holdings is positively related with CEO equity based compensation.

3.2 Cash holding and Remuneration Act 2011

Prior to 2011, cash holding was large due to global turmoil in previous decade (Bates et al., 2009) and slight external scrutiny mechanism on large cash hoarding by outside shareholders. *Remuneration Act 2011* provides power to minority shareholders to vote on their concerns towards executive compensation and firm performance. The regulation is also meant to show concerns on any segment of firm operations[9]. After the reforms on compensation we conceptualize a strong effect on cash policies of firms. The power provided to outside shareholder in the shape of dissent binding–vote is driving force to align the interest of managers and owners. The regulatory change has significantly reduced the incentives of holding large amount of cash by prohibiting the hedging of unvested executive equity [Remuneration Amendment Act 2011]. Compensation policy has economic linkage with firms' cash policies and agency issues. It is more likely that shareholders use voting power rationally (Monem & Ng, 2013)

[9] For instance, (Grosse et al., 2015) report that shareholders use the voting power to give dissent votes in highly leveraged firms to target the liquidity policy.

because of following factor: first, managers are responsible to enhance the shareholders wealth; second, corporate liquidity policies directly influence the shareholders monetary value and, rationally owners are likely to assume that control is functioning at its best possible.

Since this act affected all the listed firms in Australia, we use the regulatory changes as exogenous shock to cash policy as result of change in compensation policy when, managers incentives for hoarding cash is limited due to dissent vote in form of "two-strike" on compensation report. We expect a negative relation between corporate liquidity policy and equity compensation. Thus, we hypothesize that:

H2a: The *Remuneration Act 2011* negatively affects cash holding via compensation (Act*equity).

Figure 2 summarizes the overall novel aspect of research idea, a visual depiction is better to convey the idea to readers. Following Faff (2015), this study also applies the "Mickey Mouse" diagram to highlight novelty of the research in the Australian context. Particularly, "what's new" is shown by the interaction of three circles in Figure 2.

[Insert Figure 2 about here]

4 Research Design

4.1 Sample

The sample used in this paper consists of top 300 firms by market capitalization listed on Australian Stock Exchange (ASX) and covers the time period from 2004 to 2015. This is the largest sample and time period we could obtain from Connect 4. Therefore,

2004 marks the beginning of our sample period because this is the first year that Connect4 reports executive compensation information. It provides data on CEO compensations including value of stocks, options and long term benefits for this period. The database divides the compensation in two sets: executives and directors. To extract the data for managerial directors we drop the executive part. We extract the data for position "CEO/MD" in director compensation section. Financial data for sample firms are collected from Datanalysis Premium for all the companies. We manually updated the ASX tickers in dataset, changed during our sample period due to amalgamation and re-construction. We match the ASX codes reported in real time database of Datanalysis Premium with compensation data before combing the data from two sources. Our final sample consists of 3600 firm year observations. We sort the firms on the basis of two digit code Global Industry Classification System (GICS) codes. Table 1 summarizes the variable description for this study. We winsorize all the variables at 1st and 99th percentile to outweigh the impact of outliers. All the dollar variables are inflation adjusted to 2015 using consumer price index.

4.2 Variable description

The variable of interest in this study is corporate cash holding. The primary independent variables are CEO equity compensation. We include several additional control variables related to corporate cash holding and CEO compensation incentives. Table 1 provides the detailed definition, label and measurement of dependent, independent and control variables.

Cash holding: The primary dependent variable cash holding (CASH) is measured as ratio of cash and marketable securities to total assets, where total assets are defined as book value total assets as reported in Connect4 by following prior studies (Bates et al.,

2009; Nikolov & Whited, 2014; Liu et al., 2015). We also measure the cash holdings as cash and marketable securities to total assets as an alternative measure and find similar results. We use this measure to establish the cash reserves available at the disposal of managers in proportion to total assets. Since, this proportion is sensitive to disgorge easily upon manager's perusal.

Compensation incentives: CEO compensation incentive is measured in as equity based incentives. The equity incentives is summation of value of shares and options offered to CEOs following (Li et al., 2011; Choe, Dey, & Mishra, 2013). Options is two dimensional incentive which is the percentage of outstanding shares in options held by CEO as part of incentive to exercise at a quoted price after particular period of time or use the option value to discount the incentives from options. While shares measure the wealth stake of CEO in the firm as a percentage of total outstanding shares. Shares and stock options measure the overall risk arising out of managers holdings in firm. Risk–eschew managers prefer lower cash–flow variance (Fama, 1980). Stock options provides incentive to managers to choose variance–increasing moves (Smith & Stulz, 1985). We scale the equity incentives by CEO total compensation, equitycomp/total compensation where total compensation includes salary, bonus, super, stocks, options and any other component of pay in a given year. We scale the incentives with total compensation because CEO might have a relatively large dollar value of equity incentive but actually small relative to her total compensation.

[Insert Table 1 about here]

We use CEO tenure, CEO duality on board to control for entrenchment effect as the powerful CEO can extract rent from pay and misreport the options for obtaining

benefits from timing of options award (O'Connor, Priem, Coombs, & Gilley, 2006). We measure the CEO tenure as number of year in office as reported in Connect4.

To measure the governance structure of firm, we use board size which consists of members on board (BSIZE). Board independence is measured as percentage of independence directors as compared to total size of board (BINDRATIO). Remuneration committee size is measured as percentage of board size (REMSIZE). Remuneration committee independence is zero if independent directors are less than 50% and one if outside directors are more than 50% (REMINDRATIO) by following (Bugeja, da Silva Rosa, Duong, & Izan, 2012; Goh & Li, 2015). Remuneration committee is most relevant for determining the pay package of executives and have principal position in incentive related decision in Australia's binding vote regulation. We include remuneration committee size and independence in our model to control for effect of remuneration committee.

Other control variables in model are included by following (Bates et al., 2009). Size of firm is measured by natural log of total assets (LNSIZE). We define market–to–book ratio as book value of assets plus market value of equity less book value of equity and all is divided by the book value of assets (MTB). We define net working capital ratio as NWC/book value of assets (NWC). Leverage (LEV) is sum of long-term and short-term debt divided by book value of assets. Cash flow/assets (CF) is ratio of earning after interest but before depreciation. Capital expenditure/assets is the measure of capital expenditure incurred by firm. Dividend is dummy variable, equal to one in the year firm pays dividend and otherwise zero.

4.3 Descriptive Statistics

Table 2 reports the summary statistics of our sample, which is divided into four panels. Panel A shows cash holding which is variable of interest for this study with mean and (median) value of 18% (9%). The average cash holding is similar to US and China as documented by prior studies (see e.g.,Opler et al., 1999; Liu et al., 2015). However, Australian firms with higher cash holding pile more cash to total assets as compared to US. The 75th percentile for Australian firms is 25% whereas 17% for US and 22% for China.

[Insert Table 2 about here]

Panel B deals with CEO compensation incentives. Equity compensation averages 0.2516 unlike (Li et al., 2011) who reports 35% equity compensation during 2004–2007, median is 0.2245. Variables in Panel A and B are positively skewed with normal distribution, kurtosis suggest that tail of distribution is not heavier.

Panel C presents firm characteristics; market to book value is 2.827, net working capital is .074 averagely, dividend payout is .714 and average size of firm is 20.155 in our sample. Firms with large size hold less cash because these firms have greater opportunity of borrowing from capital market even at low transaction cost (Almeida, Campello, & Weisbach, 2004). Firms with low level of cash do not pay dividend as these firms might tend to save it for future contingencies. Firm growth opportunities has positive association with cash holding as more liquidity presents greater chances to invest on fairly right time (Opler et al., 1999).

Panel D represents firms' corporate governance characteristics. Our sample shows that average size of board is 7.651 with 50% independence. CEO duality is not

common in Australia and CEO tenure is 7.718 on average. Remuneration committee which has important space in current unique setting is average of 3 members with 70% independence.

4.4 Remuneration Act 2011

Table 2 A reports the summary statistics before and after the promulgation of act. Cash holding decreases from 0.1922 to 0.1463 on average after the act although, equity compensation increases on average but cash holding continue to decrease.

[Insert Table 2 A about here]

Figure 2 explains the same phenomena where cash holding started to decrease after 2011. The figure explains more than 10% decrease in average cash holding since the new regulation. Figure 3 elaborates the equity compensation from year 2004–2015. After regulatory changes year wise trend shows no substantial changes but cash holding decreases suggesting that *Remuneration Act 2011* has implications on corporate cash holding by decreasing the liquidity.

[Insert Figure 3 and 4 about here]

4.5 Correlation analysis

Pearson correlation matrix shows correlation between independent variables in Table 3. Correlation among the variables is not higher except few variables. Interestingly, high Pearson correlation exists between board independence and remuneration committee independence (0.80) and between firm size and board size (0.58). To test the potential effect of collinearity between these variables we calculate the variance inflation factor

(VIF). All the variables have VIF less than 3 and overall mean value is 1.55[10] suggesting that multicollinearity is not an issue in model[11].

[Insert Table 3 about here]

On the other hand, to eliminate the effect of multicollinearity we run the models without CG variables to estimate the sensitivity of estimation.

4.6 Econometric specification

This section outlines the baseline model used in examining the relationship between CEOs compensation and cash hoarding augmented with *Remuneration Act 2011*. To examine the effect of equity compensation on cash holding, we regress cash holding on equity compensation with control for industry (GICS code) and year (year dummies) fixed effect. We also test the linearity of relationship using square term for equity incentives. Following (Liu & Mauer, 2011), first we investigate the contemporaneous relation between cash holding and equity incentives. The model one shows the equation to test hypothesis H1a and H1b that state equity compensation has negative/positive relation with cash holding.

$$Cash_{it} = \alpha + \beta_1(EquityComp)_{it} + \delta_2(Controls)_{it} + \delta_3\sum(Industry\ dummy)_t + \delta_4\sum(Year\ dummy)_t + \varepsilon_{it} \quad (1)$$

Further, to control for potential endogeneity we examine the lagged CEO equity incentives by following prior studies (e.g., Harford, Li, & Zhao, 2008) using equation two.

[10] Lardaro (1993, p.446) suggests that multicollinearity can cause issue if VIF exceeds 10.

[11] We have not reported the VIF table to save the space. It is available upon request from corresponding author.

$$Cash_{it} = \alpha + \beta_1(EquityComp)_{i,t-1} + \delta_2(Controls)_{i,t-1} + \delta_3\sum(Industry\ dummy)_t + \delta_4\sum(Year\ dummy)_t + \varepsilon_{it} \quad (2)$$

We examine the effect of *Remuneration Act 2011* using equation 3 to test the hypothesis H2a. We use act as dummy variable to interact with compensation incentives to account for shock of regulatory changes on compensation components.

$$Cash_{it} = \alpha + \beta_1(EquityComp)_{it} + \beta_2(Act * equity)_{it} + \delta_3(Controls)_{it} + \delta_4\sum(Industry\ dummy)_t + \varepsilon_{it} \quad (3)$$

Where *i* denotes the individual firms (*i* = 1, 2, 3…917), and subscript *t* is time period (*t*= 2004, 2005….2015), size of firms is natural logarithm of total assets. $\alpha, \beta\ and\ \delta$ are the parameters of model while ε_{it} is the non-systematic part of model capturing errors. We also test the corporate governance using important variable of remuneration independence and board independence. Definition of variables in equations 1–3 are discussed in section 4.2 and also summarized in Table 1.

We employ the ordinary least square (OLS) to test the association of equity incentives with cash holding in time series and cross-sectional differences[12]. The standard errors are precise for within-firm correlation predicted values (Petersen, 2009). Since we have number of zero observations in compensation (stock options), so there may be estimating error due singular covariance, which results in similar coefficient. Therefore, OLS regression is conducted for equity compensation with other variables. Second, to choose between fixed effect and random effect, we perform Hausman test and un-

[12] For instance, CEOs in financial services industry earn higher level of compensation while CEOs in electric utility companies receive lower level compensation as compared to counterparts in other industries (Murphy, 1999). Controlling for industry complexity, CEOs can demand higher compensation due to talent and industry (Aggarwal, 1981)

tabulated result confirms the suitability of fixed effect to unearth the time-series variation over 12 years and to control for unobserved industry fixed effect. We use the panel data regression to capture the variation across different industries with standard error corrected for clustering of residuals at firm level.

5 Empirical Results

5.1 Multivariate Analysis

We examine the effect of compensation incentives on corporate cash holding in this section by employing multivariate regressions. Then, we report the results of impact of regulatory changes on compensation incentives and cash holdings.

5.1.1 Equity compensation

We first examine the contemporaneous relationship between cash holding and equity based compensation, where all the variables including independent and dependent are measured at time t. We control for industry and year fixed effect in our multivariate regressions. We also control for corporate governance mechanism to hold the impact of board and remuneration committee monitoring following (Edmans & Liu, 2011; Liu & Mauer, 2011). Model one to four explains contemporaneous incentives while model 5 is lagged independent variables at time t-1.

[Insert Table 4 around here]

Table 4 shows the regression results of OLS and two-way panel fixed effect estimation techniques based on Eq. (1). Model 1 shows the result using pooled OLS while considering the governance and industry effect on dependent variable while model 2 ignores the governance impact in panel data technique whereas, model 3 take into account the effect of governance mechanism on corporate cash holding to unearth the time–

variation across the industries. Model four test the nature of relationship using square of equity incentives. Based on our sample, we find statistically significant and positive relationship between cash holding and equity incentives of CEOs with reasonable explanatory power of independent variables across all the models. We find significant linear relationship of cash holding and equity compensation. The result supports our H1b which predicts the positive association of cash holding and equity incentives.

To unearth the effect of corporate governance, Harford et al. (2008) lag their variables and argue that lagged variables help to control for potential. Our conclusion is unchanged in model five based on eq. (2) where we measure the all independent variables at time t-1 to eliminate the causal effect. The possible explanation for the relationship is that Australian firms are observing precautionary cash holding following to global liquidity crunch and to avoid financial contingencies. Our result support to precautionary motive of cash holding which suggest that higher cash holding do not reflect poor performance (Mikkelson & Partch, 2003). Higher cash holding also serves as shield against external costly finance and reduces the risk of bankruptcy.

5.1.2 Impact of Regulation on compensation and cash holding

Next, we investigate the impact of *Remuneration Act 2011* on compensation and ultimately on liquidity of firm employing control variables. We use contemporaneous relationship among cash holding and compensation incentives by employing interaction term where, we measure all the variables at time t. We control for industry in our multivariate regressions. Model one and two explains contemporaneous incentives and impact of regulatory change on cash holdings.

Table 5 shows the multivariate regression results of panel fixed effect estimation technique based on Eq. (3). Model 1 shows the relationship of cash holding and equity compensation which show positive significant association. Interestingly, we find significantly negative relationship between cash holding and equity compensation in consistency to our hypothesis H2a, using interaction variable in model 2. We support H2a which states that *Remuneration Act 2011* has negatively affect the cash holdings. The results suggest that regulatory changes has tighten the control and monitoring of CEOs with existence of efficient boards. Moreover, in equity compensation manager's wealth is tied with shareholders wealth because new regulation prohibits the managers to hedge their unvested equity [Remuneration amendment act 2011]. Other substantial reason of holding less cash is dissent vote in form of 'strike' from shareholders as per *Remuneration Act 2011*. Grosse et al. (2015) find that firms with poor liquidity performance in Australia receive two strikes. So our results are consistent with that prediction that managers prefer to hold less cash to avoid two strike during annual meeting. Overall, the results from Table 5 confirms our H2a which indicates that compensation has negative association with cash holding in Australia after regulatory changes.

6 Conclusion

This study investigates the relation between corporate cash holding and CEO compensation incentives augmented with promulgation of *Remuneration Act 2011* using Australian data. Our paper represents the first known study to examine the *Remuneration Act 2011* in relation to cash holding and CEO compensation incentives. To that end, we find that cash holding has positive relation with equity incentives of using other controls variables. Next, we unearth the impact of regulatory changes on compensation incentives and surprisingly, find reverse relationship of equity based incentives and cash holding.

Our results suggest that CEOs are complying the new regulation by maximizing the shareholders' value in presence of corporate governance mechanism. Firms tend to hold low cash to avoid two strikes from shareholders in AGM. Our findings are consistent with (Tong, 2010) who find negative association of cash holding with manager equity incentives.

Our results provide an empirical evidence to support our argument that new regulation has negative impact on firms' cash policy, for instance, we find that equity compensation has negative association with cash holding. Our analysis supports the precautionary motives of cash holding by aligning the interest of shareholders.

Overall, we do not find rent extraction by managers using multi-year setting in contrast to (Chalmers et al., 2006) who report rent extraction for first year of sample. Our findings are also in contrast to US where rent extraction is significant by managers (Core & Guay, 1999) because of unique environmental prospects and restrictions. Our findings further suggest the continuity of same behaviour on the part managers, if shareholders use the votes rationally (Monem & Ng, 2013). To recapitulate, we find that higher equity compensation is more suitable approach to align the interest of manager's stockholders and debtholders.

Finally, our study provides the empirical evidence on new dimension of research helping finance scholars to understand agency problems with relationship of regulatory advancements. Moreover, our findings are helpful for remuneration committee to devise the different compensation structures for different firms. The empirical evidence allows wider investors to evaluate liquidity pattern in unique setting of Australia and stakeholder's community to make prudent decisions based on impact of EBC compensation on manager's risk taking with the lens of new regulation effect.

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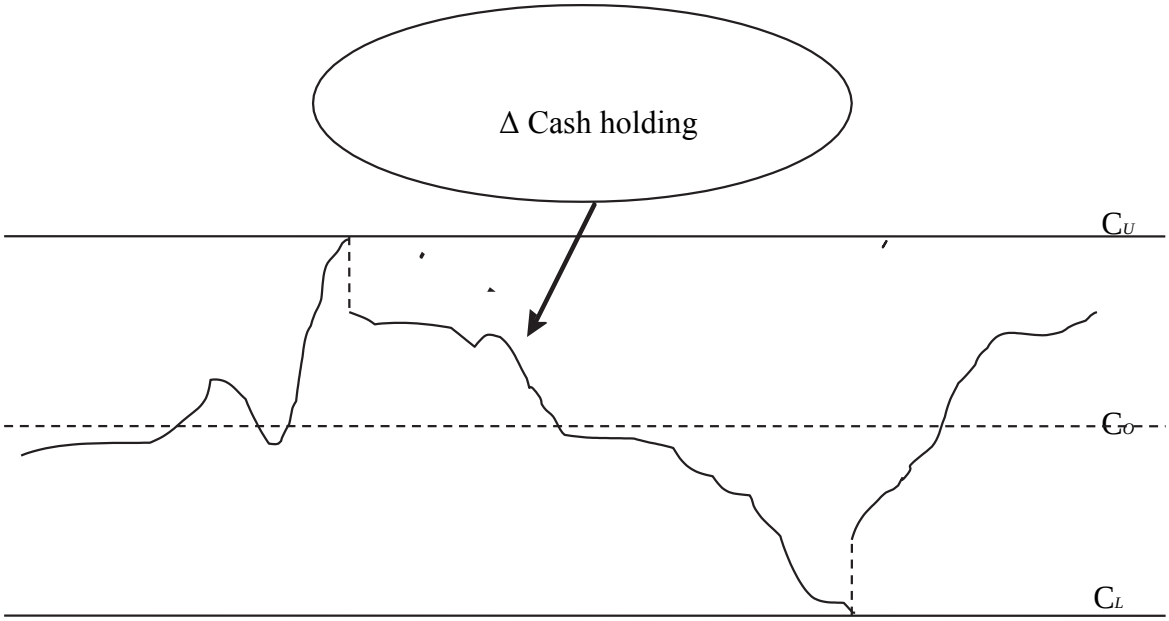
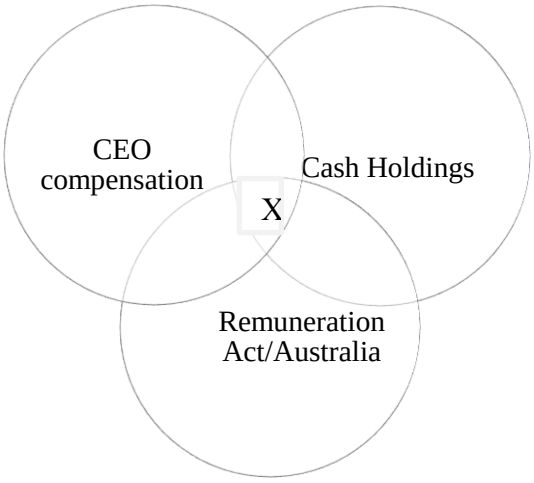
Figure 1. Equity based compensation and behavior of cash management.



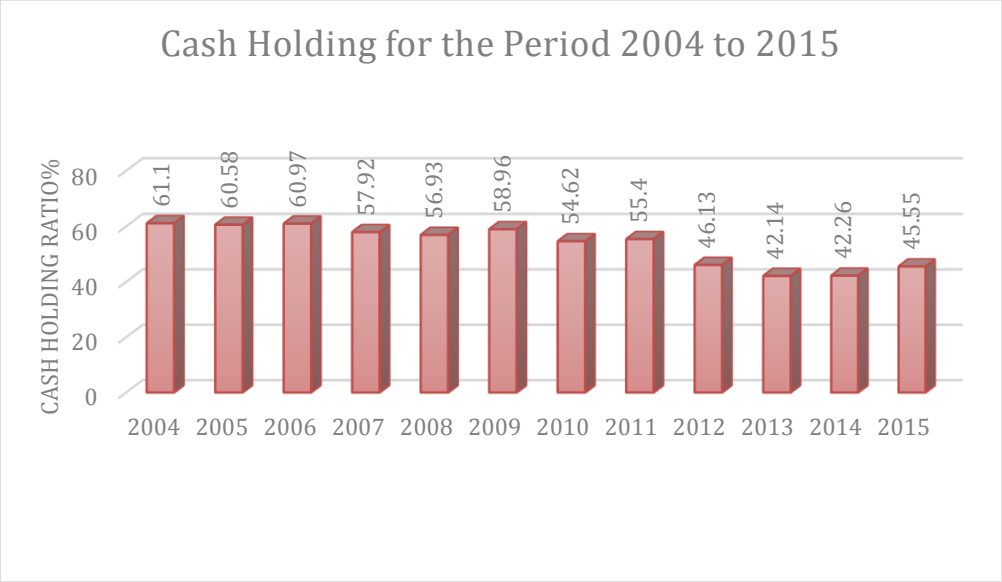
Notes: Figure 1. Equity based compensation behaviour of cash management. The line represents the hypothetical cash levels over time with upper and lower limit. Middle dotted line shows optimal cash level (Xu, 2013).

Figure 2. Novelty of research idea.



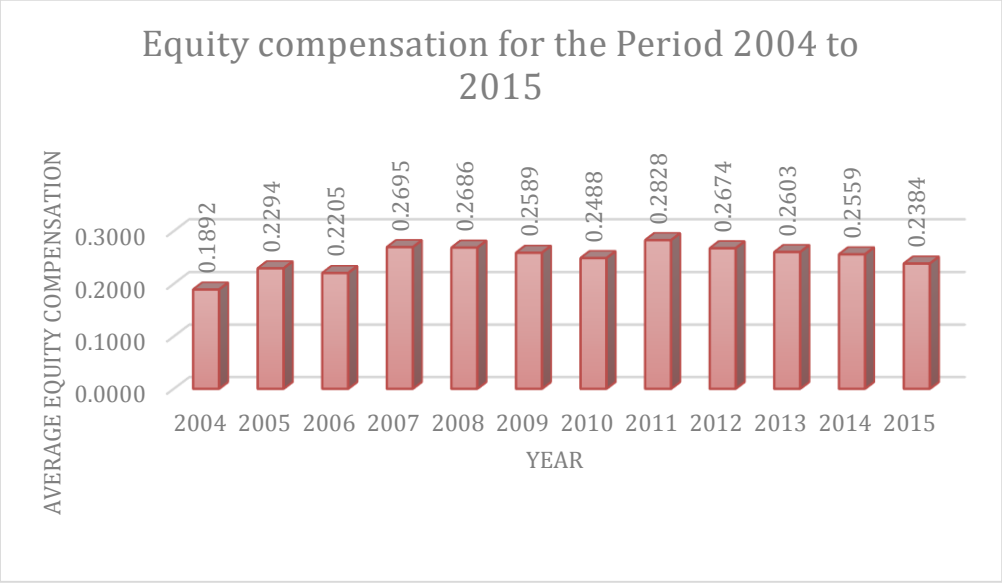
Notes: Figure 2 explains the novelty of research idea in Australian context using "Mickey Mouse" diagram. The interaction point of three circles 'X' shows contribution of the study.

Figure 3. Cash holdings by Australian firms



Notes: Figure 3 is the ratio of cash holding by Australian firms' year-by-year over the sample period from 2004-2015. Decreasing trend in cash holding is evident after the promulgation of new act on compensation regulation. The sample consists of top 300 capitalization firms listed in ASX each year. There are 3600 firm year observations. For variable definition see Table 1.

Figure 4. Equity compensation offered to CEOs



Notes: Figure 4 is the average equity based compensation offered by firms over the sample period from 2004-2015. Figure shows there is slight decrease in equity but still a major part of total compensation since the promulgation of new act in 2011. The sample consists of top 300 capitalization firms listed in ASX each year. There are 3600 firm year observations. For variable definition see Table 1.

Table 1. Variable definition

Variable Label	Name	Measurement	Data Source
CASH	Cash Holding	Ratio of cash and marketable securities to book value of total assets	DatAnalysis
EquityComp	Executive equity incentive-Proxy 1	Sum of value of options and stock granted to executive divided by total compensation	Connect 4
Governance Variables			
BdSize	Board Size	No of directors on board	Connect 4
CEO duality	CEO duality	Indicative variable 1= if CEO is chairman otherwise 0	Connect 4
IndDir	Board Independence	Percentage of independent director to board size	Connect 4
RemComm Size	Rem Comm Size	Percentage of independent director to board size	Connect 4
RemComm independence	Rem Comm Indep	Indicative variable 0= no compensation committee 1=<50% IndDir 2=>50% IndDir and 3= All IndDir	Connect 4
Control Variables			
Size	Firm Size	Size is measured by log of total assets	DatAnalysis
MTB	Market to book asset ratio	Calculated as market value equity plus book value of assets minus book value of equity divided by book value of assets.	DatAnalysis
NWC	Net working capital	NWC is measured by working capital to book value of assets	DatAnalysis
Capex	Capital expenditure	Capex is figured as capital expenditure divided by book value of assets	DatAnalysis
Div	Dividend	Dummy is one if dividend paid otherwise zero	DatAnalysis
Lev	Leverage	Sum of long and short term debt divided by book value of asset	DatAnalysis
CF	Cash Flow	Free cash flow divided by book value of assets.	DatAnalysis

Notes: Table 1 provides the definition, description and source for variables included in models. First part of table is dealing firm's cash holding and equity compensation measurement, second part is describing the governance variable, while last part depicts the control variables. The sample consists on top 300 capitalized ASX-listed firms in each year. There are 3600 firm year observations. For variable definition see Table 1.

Table 2. Descriptive Statistics

Variable	N	Mean	Std. Dev.	Min	Max	1st Quartile	Median	3rd Quartile	Skewness	Kurtosis
Panel A: Cash Holding										
Cash holding	3505	0.1769	0.1931	0.00859	0.6905	0.0385	0.0938	0.2514	1.4261	3.9999
Panel B: CEO Compensation										
Equity Compensation	2297	0.2516	0.1700	0.02521	0.6156	0.1110	0.2245	0.3613	0.5827	2.3691
Panel C: Firm Characteristics										
MTB	3600	2.8270	2.3397	0.6500	9.3031	1.1600	1.9500	3.5200	1.5209	4.4405
NWC	3600	0.0747	0.1528	-0.1403	0.4704	-0.0236	0.0288	0.1492	1.0727	3.6237
Leverage	3600	0.1672	0.1529	0.0000	0.4749	0.0028	0.1503	0.2831	0.4707	2.0038
Capex	3600	-0.0731	0.0843	-0.3028	-0.0002	-0.1016	-0.0405	-0.0117	-1.4791	4.2641
Dividend	3600	0.7147	0.4516	0	1	0	1	1	-0.9510	1.9045
Cash Flow	3600	-0.0136	0.1993	-0.7728	0.4599	-0.0754	0.0294	0.0845	-1.2215	5.8530
Size of firm	3600	20.1558	1.9247	16.9011	23.8083	18.7458	20.0574	21.5919	0.1515	2.1494
Panel D: Corporate Governance										
Board Size	3594	7.6516	2.3957	4	13	6	7	9	0.5239	2.5588
Board Independence	3594	0.4901	0.2526	0	0.9000	0.3333	0.5000	0.6923	-0.4158	2.3088
CEO Duality	3594	0.0006	0.0236	0	1	0	0	0		
CEO Tenure	3585	7.7188	5.2044	1	20	4	6	11	0.8118	2.8271
Remuneration Comm Size	3594	2.9986	1.5980	0	6	2	3	4	-0.4192	2.7848
Remuneration Independence	3073	0.6930	0.3205	0	1	0.5000	0.7500	1	-0.8368	2.709

Notes: Table 2 presents the summary statistics in different panels. Panel A deals firm's cash holding, panel B describes CEO equity compensation, panel C shows firm characteristics and panel D elaborates corporate governance. The sample period is 2004-2015. Top 300 ASX-listed on the basis of market capitalization in each year included in sample. There are 3600 firm year observations. For variable definition see Table 1.

Table 2 A. Descriptive Statistics before and after Remuneration Act 2011

Variable	N	Mean	Std. Dev.	Min	Max
Panel A: Before act					
Cash holding	2337	0.1922	0.2025	0.0086	0.6905
Equity Compensation	1426	0.2492	0.1777	0.0252	0.6156
Panel B: After act					
Cash holding	1168	0.1463	0.1688	0.0086	0.6905
Equity Compensation	871	0.2555	0.1566	0.0252	0.6156
LT Super	1048	0.0250	0.0241	0.0033	0.1168

Notes: Table 2 A presents the summary statistics in two panels before and after Remuneration Act 2011. Panel A deals firm's cash holding and CEO equity compensation before act while, panel B shows summary statistics of cash holding and compensation after the act. The sample period is 2004-2015 divided into two groups before and after the act. For variable definition see Table 1.

Table 3. Pearson Correlation Matrix

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Equity Compensation	1												
2	MTB	**0.1040**	1											
3	NWC	**-0.0323**	**-0.0971**	1										
4	Leverage	**-0.0415**	**-0.0626**	-0.0397	1									
5	Capex	**-0.1398**	**-0.1078**	**0.2308**	**0.0435**	1								
6	Dividend	**-0.1036**	**-0.0806**	**0.1461**	**0.2209**	**0.3537**	1							
7	Cash Flow	**-0.1297**	**0.0279**	**-0.1151**	**0.0790**	**0.4959**	**0.4423**	1						
8	Size of firm	**0.1423**	**-0.3214**	**0.1065**	**0.2567**	**0.2099**	**0.4594**	**0.1354**	1					
9	Board Size	**0.1087**	**-0.1444**	**0.0134**	**0.0877**	**0.0732**	**0.1944**	**0.022**	**0.5864**	1				
10	Board Independence	0.0416	**-0.0904**	**0.0863**	**0.0185**	**0.1172**	**0.2123**	**0.0926**	**0.3410**	**-0.0092**	1			
11	CEO Tenure	**-0.0097**	0.0204	**0.0715**	0.0409	**0.0239**	**0.1164**	**0.0571**	0.0421	**-0.1229**	**0.0826**	1		
12	Remuneration Comm Size	**0.0275**	**-0.0384**	0.0134	**0.0650**	**0.0162**	**0.1369**	**0.0308**	**0.2767**	0.3668	**0.0584**	**-0.001**	1	
13	Remuneration Independence	0.0407	**-0.0925**	**0.0486**	**0.0351**	**0.084**	**0.1082**	**0.0632**	**0.2278**	**0.0078**	**0.8049**	0.0264	-0.0455	1

Notes: The table 3 describes the correlation between independent variables defined in Table 1. Data for compensation and board characteristics obtained from connect4 boardroom and Morningstar database is source for financial variables for the period of 2004-2015. Correlation significant at 5% or better is marked bold. For definition of variables see Table 1.

Table 4. Regression of cash holding against CEO Equity compensation

	Contemporaneous Incentives				Lagged Incentives
Variables	Model 1 OLS	Model 2	Model 3	Model 4	Model 5
Equity Compensation	0.0660***	0.0464**	0.0399*		
	(2.94)	(2.11)	(1.79)		
Equity Compensation^2				0.0799**	
				(2.04)	
Equity Compensation t-1					0.0454***
					(2.85)
MTB	0.0193***	0.0123***	0.0117***	0.0117***	0.0067***
	(9.72)	(3.86)	(3.34)	(3.33)	(5.63)
NWC	0.0586*	0.1304	0.1691	0.1716	0.0024
	(1.73)	(1.25)	(1.54)	(1.57)	(0.12)
Capex	0.2665***	0.3307***	0.3028***	0.3023***	0.0617*
	(4.60)	(4.15)	(3.60)	(3.60)	(1.93)
Leverage	-0.3851***	-0.2480***	-0.2538***	-0.2537***	-0.2704***
	(-14.76)	(-6.47)	(-6.32)	(-6.32)	(-6.15)
Dividend	-0.0883***	-0.0154	-0.0013	-0.0008	0.0112
	(-7.35)	(-1.10)	(-0.10)	(-0.06)	(0.87)
Cash Flow	-0.0985***	0.0093	0.0126	0.0137	0.0327
	(-3.12)	(0.29)	(0.39)	(0.42)	(1.00)
Firm Size	-0.0085***	-0.0391***	-0.0323***	-0.0321***	-0.0083***
	(-2.87)	(-4.11)	(-2.99)	(-2.97)	(-5.26)
Board Independence	-0.0290		-0.0043	-0.0047	-0.0111
	(-1.22)		(-0.19)	(-0.21)	(-0.50)
CEO Tenure	-0.0009		-0.0002	-0.0002	-0.0016
	(-1.31)		(-0.21)	(-0.21)	(-1.60)
Remuneration Comm Size	0.0014		-0.0034	-0.0035	-0.0059*
	(0.47)		(-1.00)	(-1.03)	(-1.80)
Remuneration Independence	0.0188		-0.0015	-0.0012	0.0273
	(1.04)		(-0.08)	(-0.07)	(1.57)
Constant	0.4691***	1.1056***	0.8900***	0.8892***	0.5145***
	(7.68)	(5.36)	(3.09)	(3.06)	(3.86)
Industry effect	Yes	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes	Yes
N	1945	2224	1945	1945	1897
adj. R-sq.	0.388	0.206	0.202	0.203	0.165

Notes: Table 4 describes the results of multivariate regression of cash holding on equity compensation. Model 1-4 reports contemporaneous incentives and model 5 deals with lagged incentives. Model 1 show results based on pooled OLS, while model 2 is panel fixed effect without CG and model 3 describe the results with corporate governance variables. Model 4 deals with linearity of relationship by employing square term. Model 5 reports lagged incentives. The sample period is 2004-2015. Top 300 ASX-listed on the basis of market capitalization in each year included in sample. T-statistics is reported in parenthesis. Standardized beta coefficients are reported at 1%, 5% and 10% significance level with ***, **, * respectively. For variable definition see Table 1.

Table 5. Impact of Regulatory changes on CEO equity compensation and cash holding

Variables	Model 1	Model 2
Equity Compensation	0.0399*	0.0602**
	(1.79)	(2.53)
Equity Compensation*Act		-0.0655**
		(-2.41)
MTB	0.0117***	0.0114***
	(3.34)	(3.44)
NWC	0.1691	0.1717
	(1.54)	(1.57)
Capex	0.3028***	0.2806***
	(3.60)	(3.38)
Leverage	-0.2538***	-0.2565***
	(-6.32)	(-6.55)
Dividend	-0.0013	-0.0002
	(-0.10)	(-0.02)
Cash Flow	0.0126	0.0165
	(0.39)	(0.51)
Firm Size	-0.0323***	-0.0286***
	(-2.99)	(-2.89)
Board Independence	-0.0043	0.0010
	(-0.19)	(0.04)
CEO Tenure	-0.0002	-0.0003
	(-0.21)	(-0.29)
Remuneration Comm Size	-0.0034	-0.0026
	(-1.00)	(-0.79)
Remuneration Independence	-0.0015	-0.0023
	(-0.08)	(-0.79)
Constant	0.8900***	0.8131***
	(3.09)	(2.96)
Industry effect	Yes	Yes
N	1945	1945
adj. R-sq.	0.202	0.202

Notes: Table 5 describes the results of multivariate regression of cash holding on long term compensation. Model two reports equity based compensation and impact of regulatory changes on it. Model two unearths the impact of changes using interaction term.

$$Cash_{it} = \alpha + \beta_1(EquityComp)_{it} + \beta_2(Act * equity)_{it} + \delta_3(Controls)_{it} + \delta_4\sum(Industry\ dummy)_t + \varepsilon_{it}$$

The sample period is 2004-2015. Top 300 ASX-listed on the basis of market capitalization in each year included in sample. T-statistics is reported in parenthesis. Standardized beta coefficients are reported at 1%, 5% and 10% significance level with ***, **, * respectively. For variable definition see Table 1.